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On the Mortality among Her Majesty's Troops serving in the Colonies during the Years 1844 and 1845. By LIEUT.-COL. A. M. TULLOCH, F.S.S.

[Read before the Statistical Society, 21st June, 1847.]

ABOUT seven years ago a very extensive investigation was made, under the authority of Parliament, into the Sickness and Mortality among the British Troops in the Colonies, the results of which formed the basis of several papers that were read in this Society. The object of the present inquiry is to ascertain how far the various sanitary arrangements which followed upon that investigation have tended to advance the important object they had in view, and whether they hold out sufficient encouragement, as regards the saving of life, to induce perseverance in the career of improvement.

It is to be regretted that time would not admit of the results, in the present instance, being based on the returns of all the years which have elapsed since 1836, when the series of Statistical Reports on the Health of the Army terminated, and that they have necessarily been confined to the two latest years for which complete returns have been received from abroad, viz., those ending 31st March, 1845, and 31st March, 1846. I am aware that results extending over so limited a period do not afford an accurate statistical comparison with those which extend over twenty years, as experience has shown that in the most unhealthy of our colonies the mortality is extremely variable, sometimes for two, three, or even more years, undergoing a marked diminution only to reappear with tenfold violence. Had so short a period, therefore, as two years been taken as the test of comparison in any one colony, the conclusions might, at best, have been considered as doubtful, but when that comparison is extended over the whole of the colonies, both collectively and individually, and is found every where to exhibit the same remarkable improvement in the health of the troops, no reasonable doubt can be entertained of their accuracy, unless it could be supposed that the two years under review have been healthy beyond others, all over the globe, which is highly improbable.

In this view the following table is submitted for the consideration of the Society, trusting that the period is not far distant when the evidence therein adduced will be supported by full and satisfactory details extending over a longer period.

It indicates a very considerable improvement in the health of the troops in all the colonies since 1836, particularly in Jamaica, the West Indies, Bermuda, the Mauritius, and St. Helena, where, since March, 1837, they have enjoyed the advantage of fresh meat on five days in the week, instead of being, in a great measure, restricted to salt provisions. In Jamaica and the West Indies, but particularly in the former, several important changes have also been made in the localities where the white troops are stationed, and in the frequency of reliefs which now take place every third year, thereby preventing the constitution of the soldier from being broken down by repeated inroads of tropical disease.

Mortality among White Troops at the undermentioned Stations for the Two Years antecedent to 31st March, 1846, compared with the Mortality for the Twenty Years antecedent to 1836, as shown in the Military Statistical Reports.

	Average Strength of Garrison.	Mortality.			Ratio of Deaths Annually per 1000 of Strength.	Ratio Ante- cedent to 1836 by Statisti- cal Re- ports.	Difference in the Mortality of these two Periods.	
		Deaths in 1844.	Deaths in 1845.	Total Deaths in Two Years.			De- crease.	In- crease.
I.								
Gibraltar	3,371	41	41	82	12 $\frac{2}{10}$	22	9 $\frac{8}{10}$	
Malta	1,858	36	31	67	18	18 $\frac{7}{10}$	7 $\frac{1}{10}$	
Ionian Islands	2,537	35	33	68	13 $\frac{4}{10}$	28 $\frac{3}{10}$	14 $\frac{9}{10}$	
Total, Mediterranean Station	7,766	112	105	217	14	23 $\frac{5}{10}$	9 $\frac{5}{10}$	
II.								
Bermuda	1,336	17	14	31	11 $\frac{6}{10}$	32 $\frac{1}{10}$	20 $\frac{5}{10}$	
Nova Scotia and New Brunswick	2,525	28	24	52	10 $\frac{3}{10}$	17 $\frac{8}{10}$	7 $\frac{5}{10}$	
Canada	7,447	113	117	230	15 $\frac{4}{10}$	20	4 $\frac{6}{10}$	
Newfoundland	386	5	3	8	10 $\frac{4}{10}$	37 $\frac{7}{10}$	27 $\frac{3}{10}$	
Total, American Sta- tions	11,694	163	158	321	13 $\frac{7}{10}$	21 $\frac{2}{10}$	7 $\frac{5}{10}$	
III.								
New South Wales.....	1,430	25	18	43	15	14	6 $\frac{1}{10}$	
Van Diemens Land	1,846	16	29	45	12 $\frac{2}{10}$			
Cape of Good Hope....	3,018	33	44	77	12 $\frac{7}{10}$			
St. Helena	454	5	3	8	8 $\frac{8}{10}$			
Total of these Four Stations	6,748	79	94	173	12 $\frac{8}{10}$	15	2 $\frac{2}{10}$	

SUMMARY OF HEALTHY STATIONS.

Group I.	7,766	112	105	217	14	23 $\frac{5}{10}$	9 $\frac{5}{10}$	
„ II.	11,694	163	158	321	13 $\frac{7}{10}$	21 $\frac{2}{10}$	7 $\frac{5}{10}$	
„ III.	6,748	79	94	173	12 $\frac{8}{10}$	15	2 $\frac{2}{10}$	
Total.....	26,208	354	357	711	13 $\frac{8}{10}$	21 $\frac{8}{10}$	*8 $\frac{2}{10}$	

* The decrease in Mortality is best shown by the calculation that had the Mortality continued at the same rate as before 1836 the deaths in 1844 and 1845 would have been

1,140

Whereas they were only

711

Saving of life..... 429

Tropical, or Unhealthy Climates.

	Average Strength of Garrison.	Mortality.			Ratio of Deaths Annually per 1000 of Strength.	Ratio Antecedent to 1836 by Statistical Reports.	Difference in the Mortality of these two Periods.	
		Deaths in 1844.	Deaths in 1845.	Total Deaths in Two Years			De- crease.	In- crease.
Mauritius	1,748	41	37	78	22 $\frac{3}{10}$	30 $\frac{1}{10}$	7 $\frac{8}{10}$	
Jamaica	1,267	47	28	75	29 $\frac{7}{10}$	128 $\frac{8}{10}$	98 $\frac{9}{10}$	
West India Islands	2,877	171	167	338	59 $\frac{1}{10}$	82 $\frac{2}{10}$	23 $\frac{4}{10}$	
Ceylon	1,302	57	58	115	44 $\frac{7}{10}$	75	30 $\frac{8}{10}$	
	7,194	316	290	606	42 $\frac{1}{10}$	84 $\frac{2}{10}$	*42 $\frac{1}{10}$	

* This decrease in Mortality may be illustrated by the fact that had the rate continued the same as before 1836 the number of deaths in 1844 and 1845 would have been 1,212

Whereas they were only 606

Saving of life 606

Adding this to the previous result it would appear that in these two years alone there has been a saving of life equal to 1,035 men, or nearly a battalion annually.

The sanitary details of the British army may now be comprised in a very narrow compass, and will admit of but little amelioration, at least so far as regards service in the colonies. The whole force, including those serving in the East Indies and colonial corps, may be taken in round numbers at 100,000 men. Of these 66,000 are serving at home, where the mortality is only from 14 to 15 per 1000 annually; 26,000 are serving in healthy colonies, where the mortality is even lower than at home. Above 4000 are serving in the Mauritius, Jamaica, and Barbadoes, where the mortality is only between 20 and 30 per 1000 annually, and the number in colonies where the mortality exceeds the latter average is under 3000 men. In this comparison Hong Kong has been left out of view, as it formed no part of the British dominions in 1836. The following statement of the mortality at that station for a period of four years may, however, prove interesting in connexion with this subject.

Year.	Strength.	Deaths.	Ratio of Mortality per 1000 of Strength.
1842	711	228	320
1843	845	344	407
1844	949	276	291
1845	1,000	154	154
Total.....	3,505	1,002	285

Arrangements being now in progress for having the duty performed by Malays in that colony, instead of Europeans, it may be expected that no further necessity will exist, after the present year, for so great an expenditure of life.

The principal mortality in the British army of late years has arisen from service in the East Indies, of which the following details for two years will serve as an illustration :—

	Strength.	Deaths.
Bombay, 1845.....	6,324	824
„ 1846.....	4,710	337
Madras, 1845.....	7,850	276
„ 1846.....	7,535	351
Bengal, 1844.....	11,003	1,028
„ 1845.....	11,280	984
	48,702	3,800
Average	2,435	1,900

or 78 per 1000 of the mean strength annually.

As regards British troops in the East Indies, however, it must be borne in mind that the military authorities in this country exercise no control over the selection of stations, the nature and extent of accommodation, the frequency of reliefs, or any of the other contingencies by which health and efficiency are likely to be affected; nor have they the means of carrying into effect any of those sanitary arrangements which have proved so successful in the colonies; but much might, no doubt, be done towards reducing the mortality, were arrangements made, as in Jamaica, for removing them to barracks on the elevated table lands in each of the Indian provinces. Political considerations and the warfare in which we have of late years been engaged in the East may hitherto have prevented any improvements of that nature, but now that peace is re-established, and the movement of troops from the hill-stations to the plains is likely to be facilitated by the introduction of railways, it does appear practicable to make many important changes in regard to military stations, which would effect a vast saving of human life. A considerable outlay must, of course, be incurred at first in the formation of new stations, but that would be more than covered by the increased efficiency of the troops, and the diminished cost of replacing, invaliding, and pensioning them.

The preceding tables apply entirely to European troops serving abroad. It may now prove interesting to extend a similar course of observations to the influence of the same climates on the mortality of Native, or black troops, during the same periods. Of these I shall first advert to the Malta Fencibles, composed of persons born in the island.

The strength of this corps and the deaths in the two years antecedent to 31st March, 1846, were as follows :—

	Strength.	Deaths.
Year ending 31st March, 1845	575	5
„ „ 1846	574	5

being at the rate of $8\frac{7}{10}$ per 1000 on the average of these two years, while the average from 1825, when this corps was raised, till 1836, a period of eleven years, was 9 per 1000 annually. Thus this corps has proved one of the healthiest in the service; and as, in the case of other troops serving in the colonies, its health and efficiency seem to be on the increase.

The Cape Corps, composed of Hottentots, shows, however, a still lower degree of mortality during the same period; the strength and deaths for these two years having been respectively as follows:—

	Strength.	Deaths.
Year ending 31st March, 1845.....	420	3
" " 1846.....	448	3
Average of these two years.....	434	3

being at the rate of 7 per 1000 annually. While the mortality in the same corps on the average of the thirteen years antecedent to 1836 was 12 per 1000 annually, thus showing a great reduction of late years.

The ratio of mortality in both those corps has been much below what is usual even among the most select lives in this country, and shows the great advantage, wherever it is practicable, of employing the native inhabitants of our colonies, as a defensive force, in preference to regular troops sent from this country. There are, I am well aware, many political considerations which must be kept in view in a matter of this kind, but at present I am merely adverting to the question as one of health.

On comparing the diet and habits of the men composing these two corps, (which exhibit so low a degree of mortality during a long series of years,) they will be found diametrically opposite; the Maltese soldier living principally on vegetable diet, and rarely indulging in the use of fermented or spirituous liquors, while the Hottentot soldier, like others of his race, lives principally on animal food, and that of the coarsest description. Owing to the want of rain and the uncertainty of the crops, grain is often very scarce on the Eastern frontier of the Cape, where this class of troops is principally employed, and they are occasionally without vegetable or farinaceous food for several weeks, at which times they often consume from 2 to 3 lbs. of meat daily; and their usual meat ration is at all times as great as that of the European soldier. Intoxication with ardent and fermented spirits, or by smoking large quantities of a coarse description of hemp, is also by no means uncommon among them, yet has this corps proved as healthy as the Maltese Fencibles, and even still more so than the Native army of the East Indies, whose comparative exemption from disease has, by some, been attributed to the simplicity of their diet and their general abstinence from every species of intoxication. Facts such as these show with what caution deductions should be drawn when the returns of only one class of men are before us, and how necessary it is, in this, as in every other species of statistical inquiry, to extend the sphere of observation with a view to accurate results.

I shall next advert to a class of troops who, though born within the tropics, and serving in tropical colonies, are not natives of the climate in which they are stationed. First of these in number and importance are the three West India corps, recruited principally from

negroes captured in slave ships, or inhabitants of the West coast of Africa. These men are distributed throughout Jamaica and the West India Islands, and take the duty at those stations which long experience has shown to be inimical to the health of Europeans.

The strength and mortality of this class for the same two years as were before referred to has been as follows:—

JAMAICA.		
	Strength.	Deaths.
Year ending 31st March, 1845.....	770	17
" " 1846.....	912	36
	<hr/>	<hr/>
Average of these two years.....	841	26½
WEST INDIES.		
	Strength.	Deaths.
Year ending 31st March, 1845.....	994	23
" " 1846.....	1,175	32
	<hr/>	<hr/>
Average of these two years.....	1,084	27½

These troops being frequently removed from island to island there would be no utility in stating the separate mortality in each, as in most instances the calculation would involve broken periods of a year; but on the whole it appears that in Jamaica the mortality has been at the rate of about 31, and in the West Indies 26, per 1000 of the force annually, while the mortality of the same class of troops at the same stations during the twenty years antecedent to 1836 was respectively 30 per 1000 in Jamaica and 40 per 1000 in the West Indies, thus showing a marked reduction in the mortality at the latter during the last two years.

On referring to the preceding results, a very material difference will be found between the mortality of this class of troops and that of the Cape Corps and Maltese Fencibles, who are serving in their native climate, the former being nearly four times as high as either of the latter. Though the climate of the West Indies is probably as warm as that of the interior of Africa, whence the negroes are generally drawn, yet their constitutions never have, and probably never will, become assimilated to it. The high rate of mortality among them can in no respect be attributed either to the habits or the duties of the negro soldier, for others of the same race who are not in the army suffer in a corresponding proportion.

By a very extensive investigation, into which I entered when engaged in the preparation of the West India Statistical Report, about seven years ago, I found that the mortality among the negro slave population, even including families who had been for several generations in these colonies, amounted to about 30 per 1000 annually of all ages. Very little of this mortality occurred among infant life, it fell principally on persons of mature age, among which class it was nearly double the proportion usually observed among the civil population in this country. That under such a mortality the negro race can ever increase, or even keep up their numbers in the West Indies, appears a physical impossibility; and there is good reason to believe that the want of labour so much complained of, and the demand for immigration from other countries, so much insisted on by planters, as essential

to the prosperity of the colony, arises more from this waste of life than from the increasing cultivation of the soil, and that a careful investigation into the mortality of the negro population at different ages, would show that the period is not far distant at which that race would become entirely extinct in the West Indies but for the occasional accession to their numbers by fresh importations.

The results on which these observations, as to the mortality of the negro population were founded, extended, it is true, over a period when slavery prevailed in the island; and it would be interesting to those philanthropists who then attributed the high rate of mortality to that cause, now to trace from the returns of each island whether any diminution has taken place since freedom was established among our sable brethren; but when it is shown by these results that negro soldiers in the prime of life, with every advantage in point of income, clothing, comfort, and medical attendance which the British soldier enjoys, with precisely the same diet, (if that can be considered an advantage,) and with much greater regularity of habits than he can boast of, are subject to an annual mortality of from $2\frac{1}{2}$ to $3\frac{1}{2}$ per cent., there is little reason to hope that, whether bond or free, the negro race will ever thrive or increase in the West Indies.

The same remarks, as regards the unsuitableness of the climate, will, in a great measure, apply to the next class of troops to which I have to advert, viz., the Ceylon Rifle Regiment, composed of Malays, brought principally from the Straits of Malacca for the purpose of serving in Ceylon, where the climate, though equally warm, does not appear by any means congenial to their constitution, as must be apparent from the following results regarding the mortality:—

	Strength.	Deaths.
Year ending 31st March, 1845.....	1,952	46
„ „ 1846.....	1,930	36
Average of these two years.....	1,941	41

making an annual mortality of 21 per 1000, while the ratio among the same class of troops for the twenty years antecedent to 1836 was 27 per 1000 annually.

Though this mortality is considerably lower than that of the negro troops in the West Indies, it is nearly twice as high as that which occurs among the Native troops serving on the continent of India adjacent,—a sufficient proof that the Malay race is never likely to become assimilated to the climate of Ceylon; indeed, it has long been a subject of remark that though their children have been encouraged to enter the service at a very early age, in order to recruit the force, that expedient has proved insufficient without the constant importation of recruits from the Malay coast.

The mortality among this class of troops, as among every other to which I have adverted, has undergone a considerable reduction within the last two years as compared with the twenty years antecedent to 1836, owing, no doubt, to late improvements and ameliorations in the condition of the soldier; but there is little hope, either in the case of the Malay or the Negro, that this reduction will be sufficiently progressive to hold out a reasonable prospect of these races becoming

thoroughly assimilated either to the climate of Ceylon in the one case, or to that of the West Indies in the other.

To ascertain the races of men best fitted to inhabit and develop the resources of different colonies is a most important inquiry, and one which has hitherto attracted too little attention, both in this and other countries. Had the Government of France, for instance, adverted to the absolute impossibility of any population increasing or keeping up its numbers under an annual mortality of 7 per cent. (being that to which their settlers are exposed at Algiers), it would never have entered on the wild speculation of cultivating the soil of Africa by Europeans, nor have wasted a hundred millions sterling with no other result than the loss of 100,000 men who have fallen victims to the climate of that country. In such questions military returns, properly organized and properly digested, afford one of the most useful guides to direct the policy of the colonial legislator; they point out the limits intended by Nature for particular races, and within which alone they can thrive and increase. They serve to indicate to the restless wanderers of our race the boundaries which neither the pursuit of wealth nor the dreams of ambition should induce them to pass, and proclaim in forcible language that man, like the elements, is controlled by a Power which hath said, "Hither shalt thou come, but no further."

Statistics of the Sanitary Condition of the Borough of Reading. By
JOHN BILLING, Esq., F.S.S., *Architect.*

[Read before the Statistical Society of London, 15th February, 1847.]

THE structural arrangements of a town appear to constitute its sanitary condition, more than the circumstances attendant upon its locality. With but few exceptions, nature has made every site which is adapted for the occupations of mankind in towns, also eligible for the health and longevity of the inhabitants. Indeed, it is admitted that towns may be equally healthy with rural districts, and that the arrangements necessary to secure that condition are attained more economically in the former than in the latter.

That the comparative health of towns is dependent mainly upon the draining and paving has been fully proved. All the investigations which have been made have established the fact of their strict correspondence.

It is therefore important in ascertaining the causes of disease and mortality, and in adopting means for their removal, to classify the facts in a tangible form. The circumstances in which the town of Reading has lately been placed, have afforded me an opportunity of investigating and arranging these details. The Corporation of Reading having received from medical practitioners and others assurances that much of the excess of illness and mortality which occurred in the town in the autumn of 1846, was due to defective drainage, instituted a rigid inquiry into the causes which were stated to exist, with a view to obtaining a legislative enactment for their removal. I was directed to make a statistical inquiry into the sanitary condition of the borough, and upon the completion of that inquiry an elaborate work was the result, of which the subjoined Tables are summaries.